Children's Environmental Health and Disease Prevention Research Center

AT DARTMOUTH

Do Health Care Providers have a Role to Play in Promoting Well Water Testing?

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Director, Community Outreach and Translation Core

The New Hampshire Birth Cohort Study

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Funding for the Dartmouth Children's Center is Made Possible by:

NIEHS P01 ES022832
U.S. EPA RD-83544201

We would like to thank our New Hampshire Birth Cohort Study participants for their invaluable contributions to our work!

Outline

- Describe the Dartmouth Children' Center and the NH Birth Cohort Study
- Describe our early work defining role of health care providers in influencing testing of private wells
- Partnership with the Northern New England Primary Care Practice Based Research Network ("CO-OP")
- Results of an intervention study among 12 CO-OP practices

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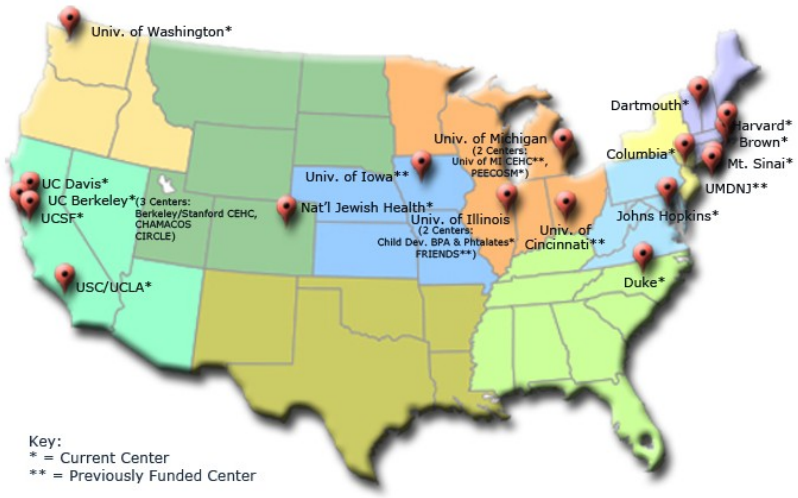
Children's Environmental Health Centers EPA/NIEHS

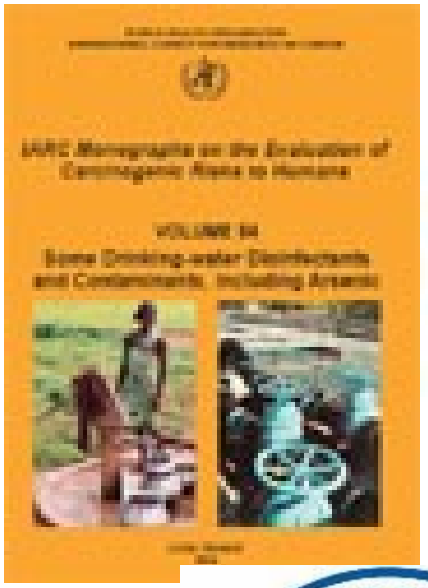


- Better understand the effects of environmental contaminants on children's health
- Explore ways to reduce threats to children's health from environmental exposures
- Promote translation of basic research findings into intervention and prevention methods

http://epa.gov/ncer/childrenscenters/basic_info.html

Arsenic: health effects

- **Established carcinogen for skin, bladder and lung cancer**
- **Wide range of non cancer health effects**
- **Uncertainty about health effects at exposure levels common to the US**



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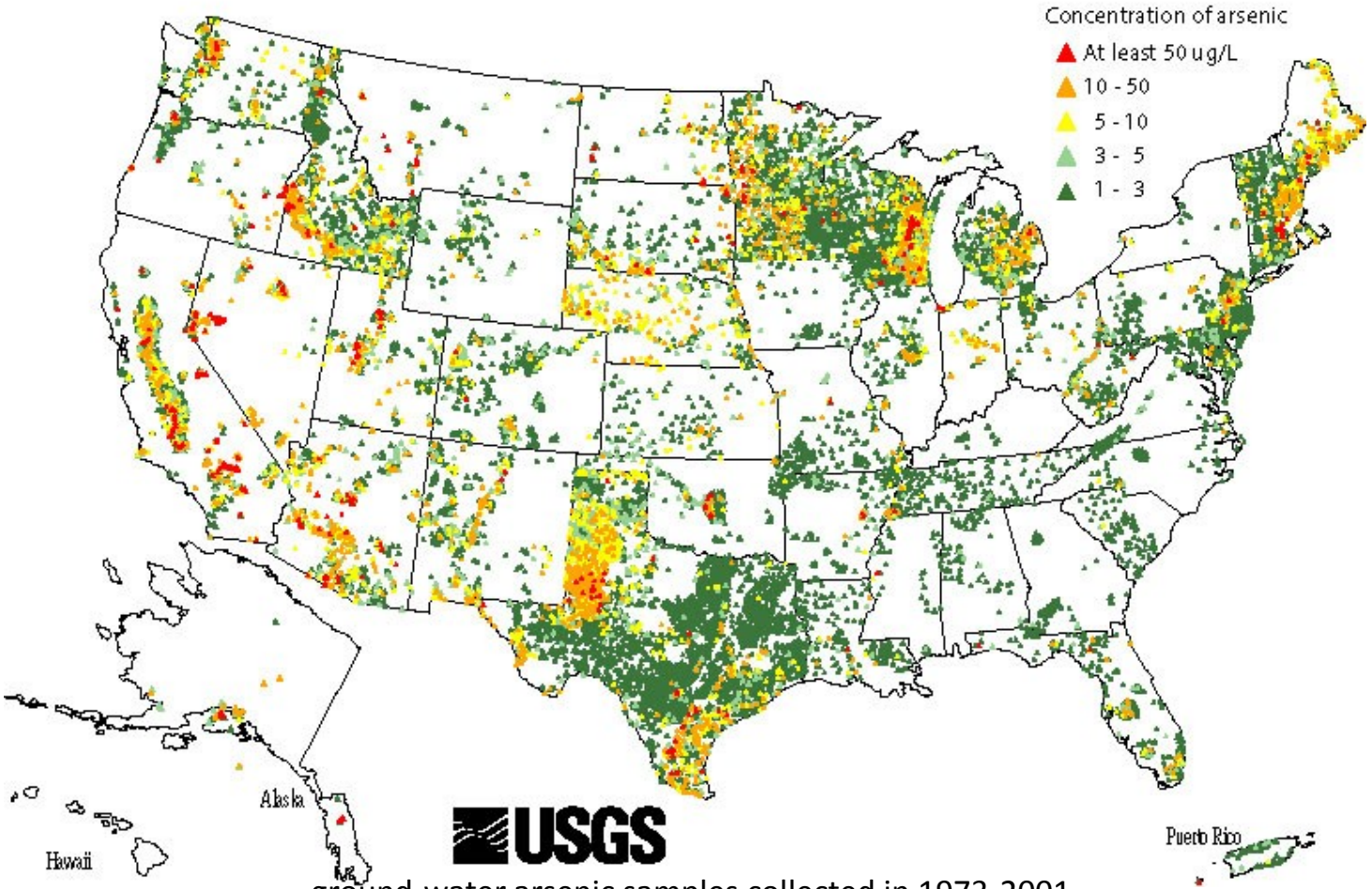
Arsenic – A National Problem



ground-water arsenic samples collected in 1973-2001

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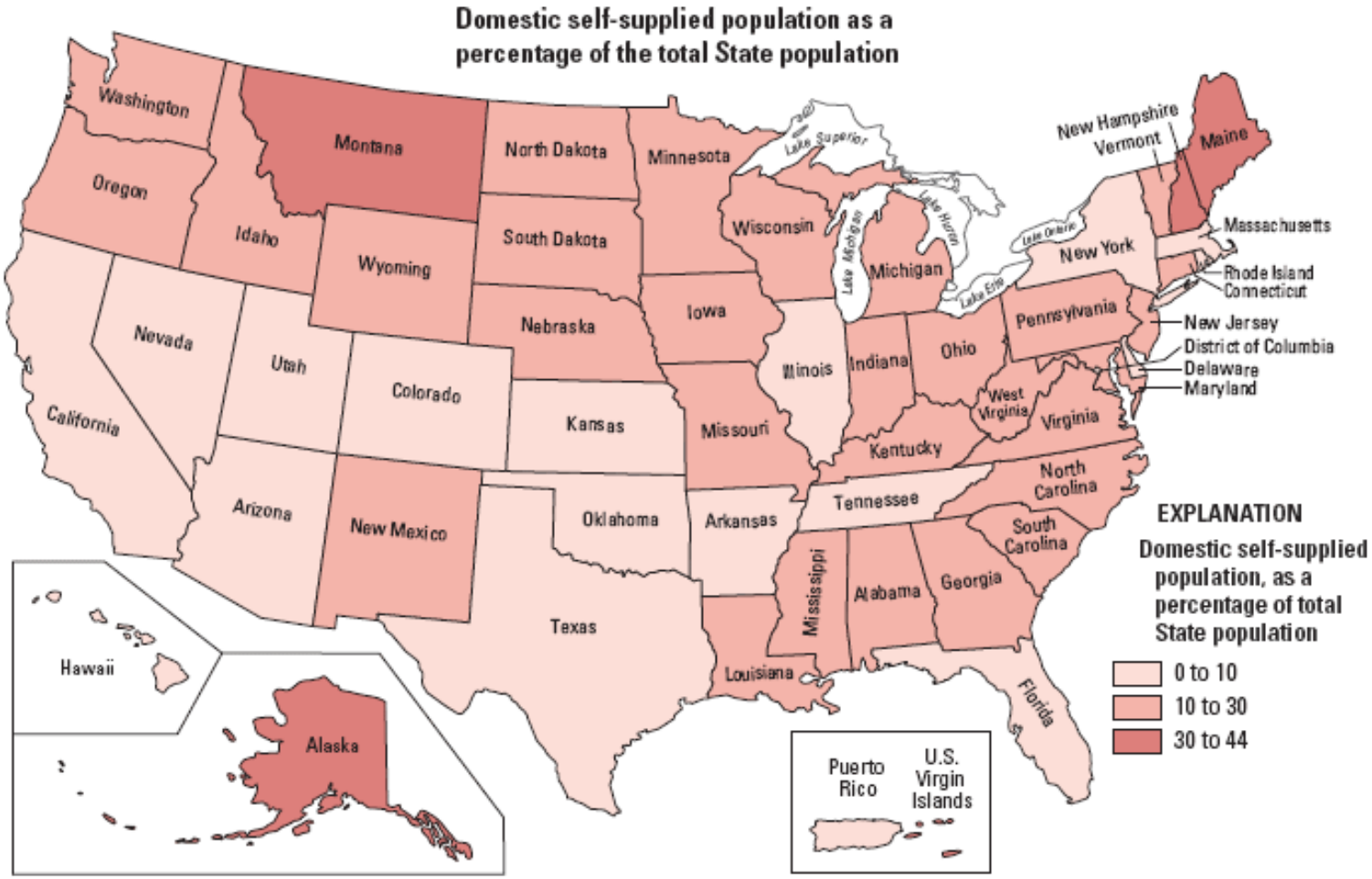
Private Wells



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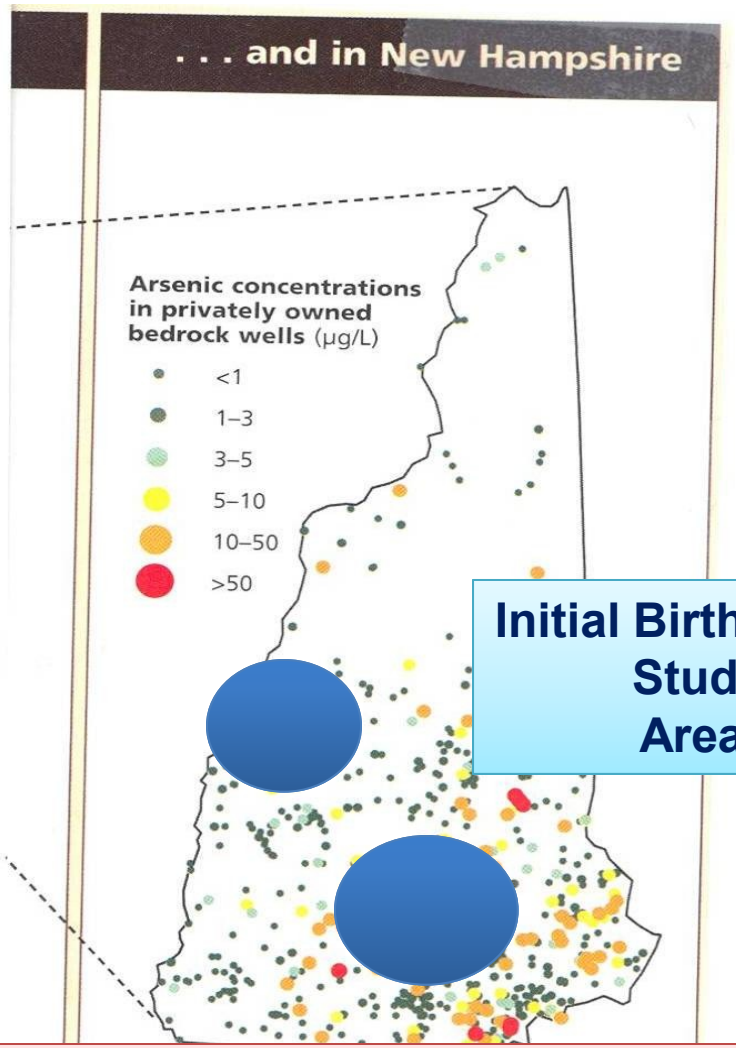
New Hampshire Birth Cohort Study

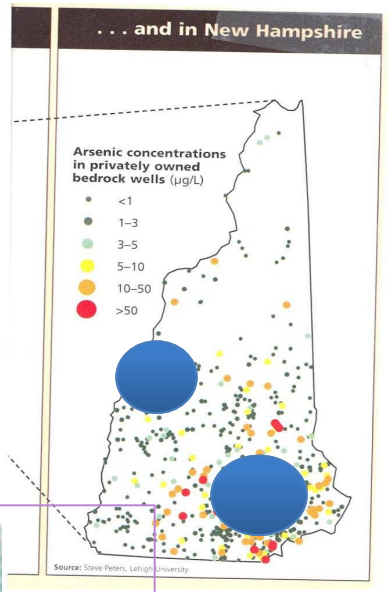
- 40% of New Hampshire households served by private water systems
- Restricted study to pregnant women with private well at home
- Included a region with high concentrations based on our earlier work



15% of pregnant women – tap water exceeds the MCL of 10 µg/L As

New Hampshire Pregnancy Cohort

Pregnancy → **Delivery** → **Months 4-8** → **Year 1-5**



- 3 day diary of water, fish/seafood and rice intake

New Hampshire Pregnancy Cohort

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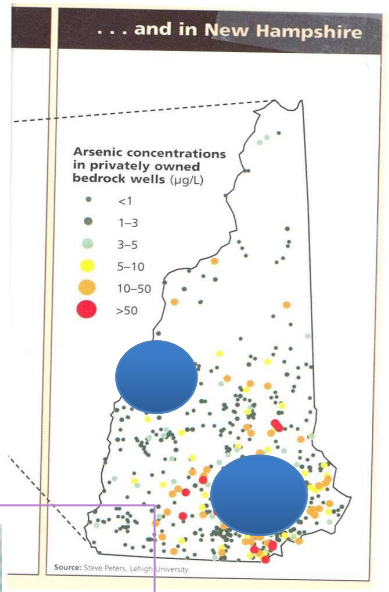


- Feeding, infections, allergies & other health outcomes

Key Questions being Addressed by our Center

1) Does arsenic exposure affect the immune system of pregnant women and their children?

1) Are well water and food significant sources of arsenic for infants and children?

1) Are there associations between exposure to arsenic in well water and food and children's growth and neurodevelopment?

1) How does arsenic interfere with key development pathways to affect the health of children?

Community Outreach and Research Translation:

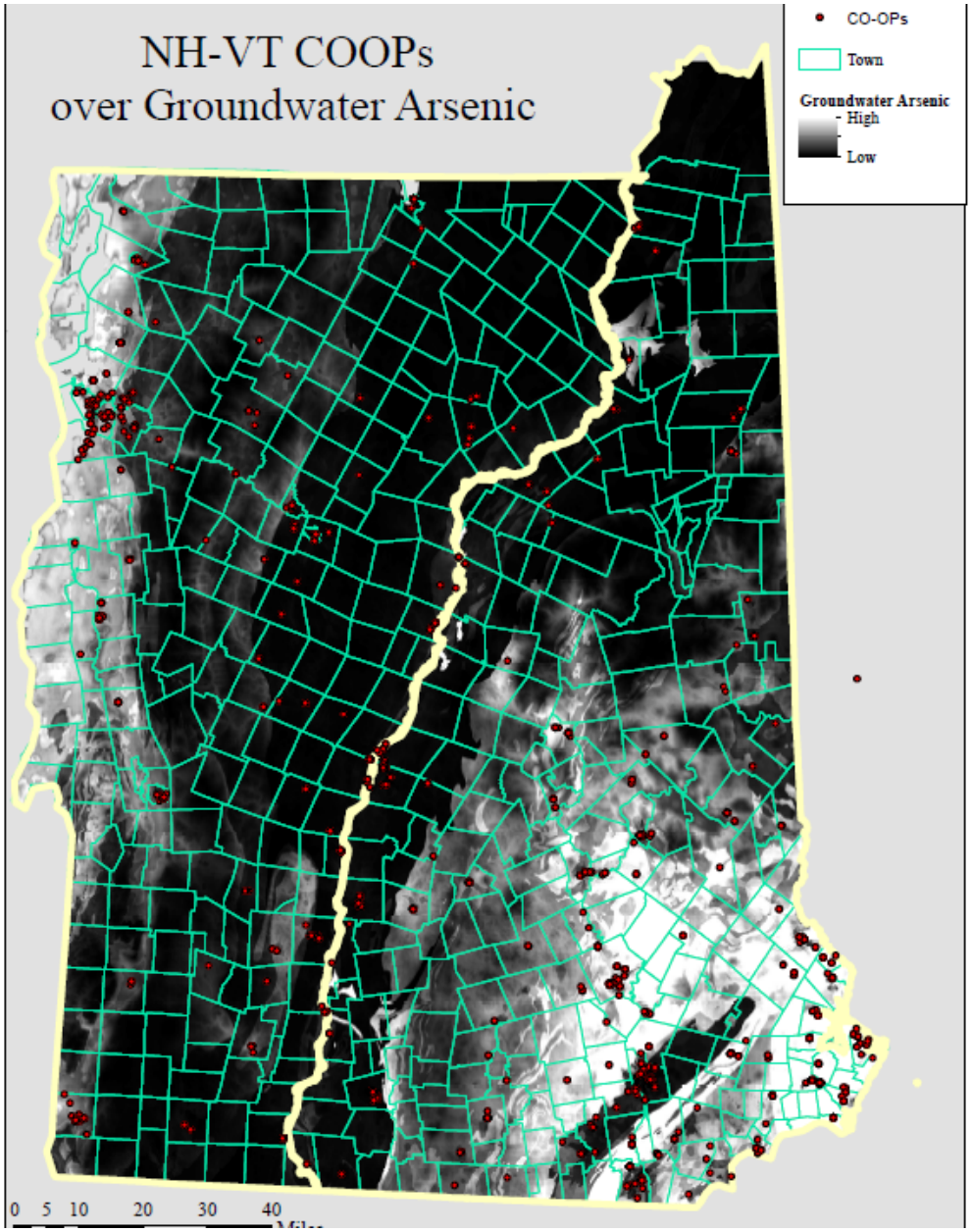
Focus Groups with Birth Cohort Moms:

1. Most participants had no knowledge of prior arsenic testing of their private wells
2. Obstetric providers did not routinely ask about water source or well testing
3. Most (>80%) stated that if their provider had recommended testing, they would have likely done so
4. Some mothers had been encouraged to test their wells for fluoride by pediatricians/dentists

Research Translation- Outreach

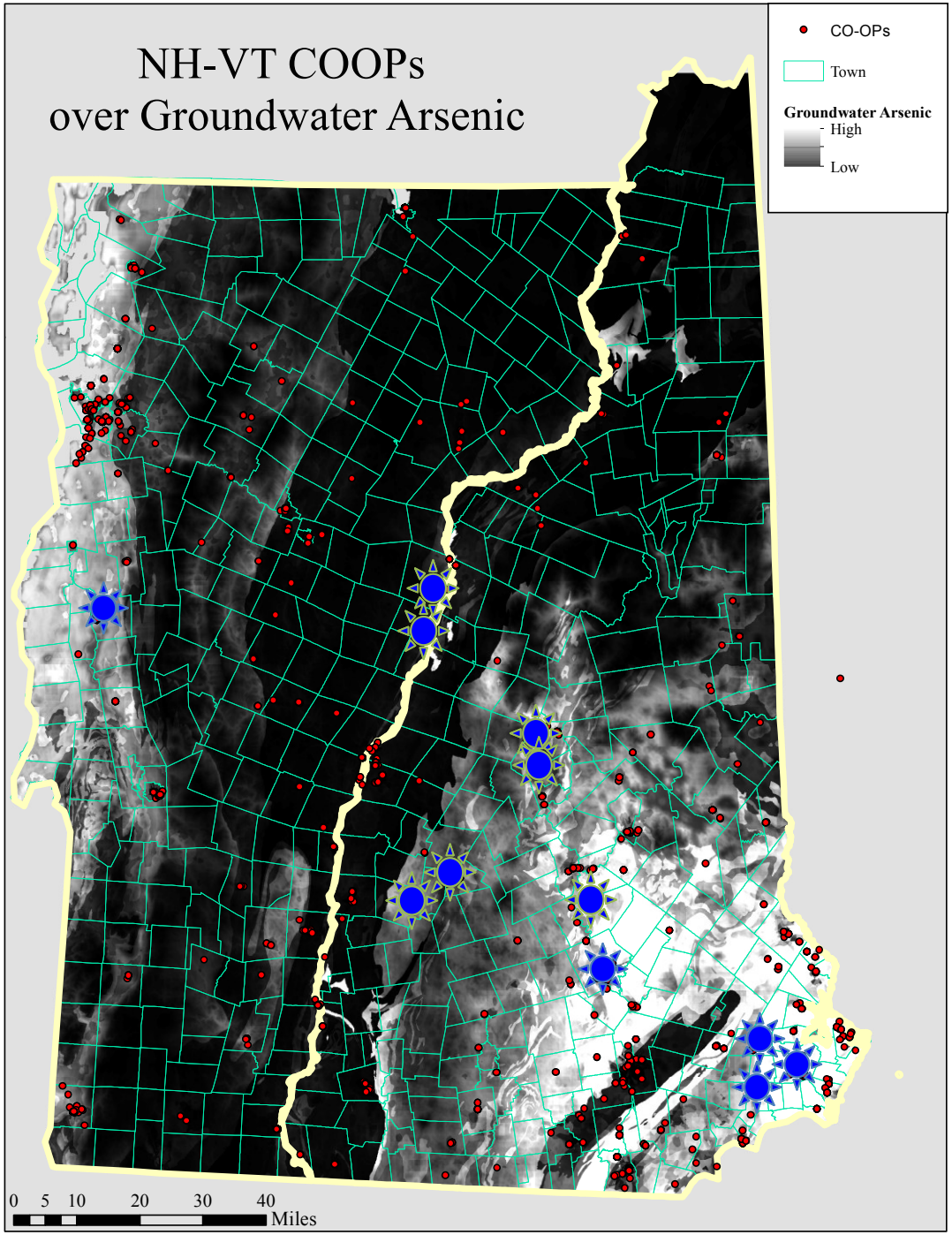
- Dartmouth/ Northern New England Primary Care CO-OP
  - Voluntary, cooperative network of independent clinicians (NH,VT,ME)
  - Experience and interest in evaluating screening and prevention oriented interventions
  - Over 75 practices and >300 clinicians
    - Majority rural

- USGS mapping of probabilities of elevated As
- Geo-coding of COOP practices
- Recruitment targeting areas "light areas" in towns with high % well users



Participating
Sites of the Dartmouth CO-OP
Primary Care Research Network

12 clinics
>50 clinicians



Baseline Practice Surveys

- 0/12 clinics routinely inquired about water source nor had a systematic method of recording this in the patient's medical record
- Few clinics could accurately estimate the proportion of their practice that used private water systems for their drinking water
- <20% were aware that EPA regulations did **not** cover private wells, <20% were aware of regional arsenic issues
- Most asked about well water in newborn visits related to fluoride supplementation

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Water testing Dilemma

- Few clinicians inquire about water source and environmental health aspects of water not discussed
- Focus on testing for fluoride in infants
- Clinicians acknowledge patients seldom complete water testing when recommended for fluoride
- What approach at well child visits for infants optimizes parent completion of well water testing?

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Integrating Well Water Testing into Routine Pediatric Care

Study Objectives:

- Increase health care provider/clinic knowledge and self efficacy about well testing and Arsenic
- Increase the proportion with children (≤ age 1) completing basic well testing, including Arsenic
- Identify **most effective office approach** for integration of well testing into routine well child preventive care

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Study Design

- Setting: 12 non-urban primary care practices (9 pediatric and 3 family medicine) in VT and NH with families served by home wells
- Two variables: study results to health care provider and tracking/ follow up
- Block randomization of 3 practices per arm
- Pre-paid testing kits for Arsenic, Fluoride, Nitrates/Nitrites, Coliforms (e. coli), pre-paid shipping

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Public Health and Medical Models Tested

Access to Results Vs. Follow up Post Visit

		Access to Well Water Testing Results	
		Parent Sent Results	Parent and Clinician Sent Results
Follow up after Visit	Advice and testing kit at WCC visit No planned follow up	Parent mailed results and guide to interpret Single visit discussion PUBLIC HEALTH MODEL 1	Parent mailed results and guide to interpret Results faxed to practice clinician Single visit discussion No specific follow-up system, follow up of results determined by individual clinician MEDICAL MODEL 1
	Advice and testing kit + Office Follow Up	Parent mailed results and guide to interpret Clinician inquiry about test results at next well visit within 2 months, encourage testing PUBLIC HEALTH MODEL 2	Parent mailed results and guide to interpret Results faxed to practice clinician Practice assistance setting up a tracking system Designated staff to monitor if testing done, contact family MEDICAL MODEL 2

All clinical sites received information/resources if parent questions about steps if positive test, including state-specific web sites regarding well water arsenic and remediation

Practice Materials- Customized to Vermont and New Hampshire Health Departments

Why Arsenic is Bad

- In children, it can affect growth and brain development
- For pregnant women, it may cause low birth weight and affect brain development in babies
- People who drink water with too much arsenic for many years are more likely to get cancer

One in every 5-10 wells in our region has unhealthy levels of Arsenic

Has Your Well Been Tested?

Did this testing include arsenic, a common natural contaminant in our groundwater?

If you cannot answer YES, to both of these questions, then TEST YOUR WELL WATER!

The Children's Environmental Health & Disease Prevention Research Center at Dartmouth

If you have additional questions or concerns please contact us.

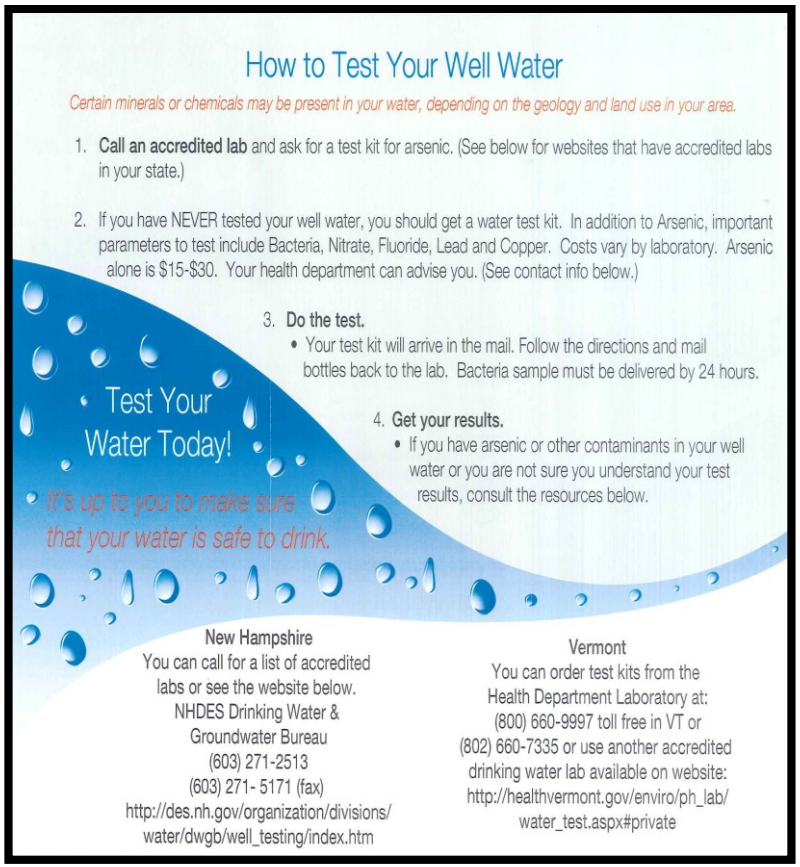
Ph: 603.653.3440

Information Provided by the Children's Environmental Health and Disease Prevention Research Center at Dartmouth with support from NIEHS: P01 ES022832 / U.S. EPA: RD83544201

Is Your Well Water "HEALTHY" For You & Your Children?

Protect Your Family Testing Information Inside

www.DartmouthCoopProject.org



How to Test Your Well Water

Certain minerals or chemicals may be present in your water, depending on the geology and land use in your area.

1. **Call an accredited lab** and ask for a test kit for arsenic. (See below for websites that have accredited labs in your state.)
2. If you have NEVER tested your well water, you should get a water test kit. In addition to Arsenic, important parameters to test include Bacteria, Nitrate, Fluoride, Lead and Copper. Costs vary by laboratory. Arsenic alone is $15-$30. Your health department can advise you. (See contact info below.)
3. **Do the test.**
   - Your test kit will arrive in the mail. Follow the directions and mail bottles back to the lab. Bacteria sample must be delivered by 24 hours.
4. **Get your results.**
   - If you have arsenic or other contaminants in your well water or you are not sure you understand your test results, consult the resources below.

Test Your Water Today!

It's up to you to make sure that your water is safe to drink.

New Hampshire
You can call for a list of accredited labs or see the website below.
NHDES Drinking Water & Groundwater Bureau
(603) 271-2513
(603) 271- 5171 (fax)
http://des.nh.gov/organization/divisions/water/dwgb/well_testing/index.htm

Vermont
You can order test kits from the Health Department Laboratory at:
(800) 660-9997 toll free in VT or
(802) 660-7335 or use another accredited drinking water lab available on website:
http://healthvermont.gov/enviro/ph_lab/water_test.aspx#private

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Testing Results for each approach

Practice Model	Kits Dispensed	Water Test completed (%)	# abnormal (%)	# As> 10 PPB (%)	Coliforms (%)
Medical 1	58	10 (17.2)	2	0	2
Medical 2	62	28 (45.1)	6	4	2
Public Health 1	69	18 (26)	8	5	3
Public Health 2	51	14 (27.4)	4	1	3
Totals	240	70 (29.1)	20 (28.5)	10 (50)	10 (50)

* 1 positive for coliforms and e-coli

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Conclusions

- Clinics with access to results and systematic follow-up had the highest rate of completed water testing, but not that much higher than community testing programs
- After education and with identified informational resources, clinics were comfortable promoting well testing and reviewing test results
- Testing barriers for parents included need to overnight specimens for coliform testing

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- WHO:
  - "conditions in which people are born, grow, live, work and age" and
  - "the fundamental drivers of these conditions"

Dr. Mona Hanna-Attisha

Elevated BLL

NYTimes 1/20/2016

Conclusions

- Emphasis on “population health” in clinical practice may provide more opportunities for including “environmental health determinants” into clinical practice (e.g. radon)
- Clinicians are important stakeholders and patient advocates (Dr. Mona Hanna-Attisha)
- Medical education is recognizing the need for renewed emphasis of environmental health and human health impacts

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Conclusions

- Physicians have limited knowledge about environmental health topics such as water quality but..
- Patients identify their clinicians as trusted resources for environmental health information
- Thus, need to further educate and provide informational resources

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